WHAT IS CLAIMED IS:

1. A method for manufacturing a semiconductor film, comprising the steps of:

preparing a first member including a semiconductor substrate, a semiconductor layer, and a separation layer provided between the semiconductor substrate and the semiconductor layer;

bonding or attracting a second member which is hardly heated by induction heating, onto the semiconductor layer of the first member; and

separating the semiconductor layer from the semiconductor substrate at the separation layer by heating the semiconductor substrate by induction heating.

2. A method according to Claim 1, wherein said step for preparing the first member comprises a step of forming a porous silicon layer, serving as a separation layer, by anodizing a surface of a nonporous silicon substrate, and a step of forming a nonporous silicon layer on the porous silicon layer according to epitaxial growth.

3. A method according to Claim 1, wherein said step for preparing the first member comprises a step of forming an ion-implanted layer, serving as a separation layer, except for a silicon layer where ions are not implanted on a surface thereof, by implanting at least one type of ions selected from hydrogen, nitrogen and helium to a predetermined depth from a surface of a silicon substrate.

4. A method according to Claim 3, wherein said step for preparing the first member further comprises a step of forming a protective film on the surface of the silicon substrate before implanting the ions.

5. A method according to Claim 1, wherein said step of heating the semiconductor substrate by induction heating comprises a step of mounting the bonded or attracted first and second members on an induction-heating mount around which a coil is

wound, and causing a current to flow in the semiconductor substrate by supplying the coil with a high-frequency current.

6. A method according to Claim 1, further comprising a step of forming slits in the separation layer before heating the semiconductor substrate by induction heating.

7. A method according to Claim 1, wherein, in said step of heating the semiconductor substrate by induction heating, a tensile force, a compressive force or a shearing force is simultaneously applied to the separation layer.

8. A method according to Claim 1, wherein, in said step of heating the semiconductor substrate by induction heating, a pressure or a hydrostatic pressure by a fluid is simultaneously applied to the separation layer.

9. A method according to Claim 1, wherein, in said step of heating the semiconductor substrate by induction heating, the second member is simultaneously cooled.

10. A method according to Claim 1, further comprising a step of removing a residue of the separation layer remaining on the semiconductor layer according to etching, after separating the semiconductor layer.

11. A method according to Claim 1, further comprising a step of reutilizing a remaining semiconductor substrate for preparing another first member, after separating the semiconductor layer.

12. A method according to Claim 11, further comprising a step of removing a residue of the separation layer remaining on the semiconductor substrate according to etching, before reutilizing the semiconductor substrate.

13. A method for manufacturing a semiconductor film comprising the steps of:

preparing a first member including a semiconductor substrate, a semiconductor layer, and a separation layer provided between the semiconductor substrate and the semiconductor layer;

bonding or attracting a second member whose resistivity is higher than a resistivity of the semiconductor substrate, onto the semiconductor layer of the first member; and

separating the semiconductor layer from the semiconductor substrate at the separation layer by heating the semiconductor substrate by induction heating.

14. A method according to Claim 13, wherein said step for preparing the first member comprises a step of forming a porous silicon layer, serving as a separation layer, by anodizing a surface of a nonporous silicon substrate, and a step of forming a nonporous silicon layer on the porous silicon layer according to epitaxial growth.

15. A method according to Claim 13, wherein said step for preparing the first member comprises a step of forming an ion-implanted layer, serving as a separation layer, except for a silicon layer where ions are not implanted on a surface thereof, by implanting at least one type of ions selected from hydrogen, nitrogen and helium to a predetermined depth from a surface of a silicon substrate.

16. A method according to Claim 15, wherein said step for preparing the first member further comprises a step of forming a protective film on the surface of the silicon substrate before implanting the ions.

17. A method according to Claim 13, wherein said step of heating the semiconductor substrate by induction heating comprises a step of mounting the bonded or attracted first and second members on an induction-heating mount around which a

coil is wound, and causing a current to flow in the semiconductor substrate by supplying the coil with a high-frequency current.

18. A method according to Claim 13, further comprising a step of forming slits in the separation layer before heating the semiconductor substrate by induction heating.

19. A method according to Claim 13, wherein, in said step of heating the semiconductor substrate by induction heating, a tensile force, a compressive force or a shearing force is simultaneously applied to the separation layer.

20. A method according to Claim 13, wherein, in said step of heating the semiconductor substrate by induction heating, a pressure or a hydrostatic pressure by a fluid is simultaneously applied to the separation layer.

21. A method according to Claim 13, wherein, in said step of heating the semiconductor substrate by induction heating, the second member is simultaneously cooled.

22. A method according to Claim 13, further comprising a step of removing a residue of the separation layer remaining on the semiconductor layer according to etching, after separating the semiconductor layer.

23. A method according to Claim 13, further comprising a step of reutilizing a remaining semiconductor substrate for preparing another first member, after separating the semiconductor layer.

24. A method according to Claim 23, further comprising a step of removing a residue of the separation layer remaining on the semiconductor substrate according to etching, before reutilizing the semiconductor substrate.

25. A method for manufacturing a semiconductor film comprising the steps of:

preparing a first member including a semiconductor substrate, a semiconductor layer whose resistivity is higher than a resistivity of the semiconductor substrate, and a separation layer provided between the semiconductor substrate and the semiconductor layer; and

separating the semiconductor layer from the semiconductor substrate at the separation layer by heating the first member by induction heating.

26. A method according to Claim 25, further comprising a step of bonding or attracting a second member which is hardly heated by induction heating, onto the semiconductor layer of the first member, before heating the first member by induction heating.

27. A method according to Claim 25, further comprising a step of bonding or attracting a second member whose resistivity is higher than a resistivity of the first member, onto the semiconductor layer of the first member, before heating the first member by induction heating.

28. A method according to Claim 25, wherein the resistivity of the semiconductor layer is at least 10 times the resistivity of the semiconductor substrate.

29. A method according to Claim 25, wherein the resistivity of the semiconductor layer is at least 1 Ω •cm, and the resistivity of the semiconductor substrate is equal to or less than 0.1 Ω •cm.

30. A method according to Claim 25, wherein said step for preparing the first member comprises a step of forming a porous silicon layer, serving as a separation layer, by anodizing a surface of a p^+-type nonporous silicon substrate, and a step of

forming a p^--type nonporous silicon layer on the porous silicon layer according to epitaxial growth.

31. A method according to Claim 25, wherein said step for preparing the first member comprises a step of forming a p^--type silicon layer on a p^+-type silicon substrate according to epitaxial growth, and forming an ion-implanted layer, serving as a separation layer, except for a p^--type silicon layer where ions are not implanted on a surface thereof, by implanting at least one type of ions selected from hydrogen, nitrogen and helium to a predetermined depth from a surface of the p^--type silicon layer.

32. A method according to Claim 31, wherein said step of preparing the first member further comprises a step of forming a protective film on the surface of the p^--type silicon layer before implanting the ions.

33. A method according to Claim 25, wherein said step of heating the semiconductor substrate by induction heating comprises a step of mounting the first member on an induction-heating mount around which a coil is wound, and causing a current to flow in the semiconductor substrate by supplying the coil with a high-frequency current.

34. A method according to Claim 25, further comprising a step of forming slits in the separation layer before heating the first member by induction heating.

35. A method according to Claim 25, wherein, in said step of heating the first member by induction heating, a tensile force, a compressive force or a shearing force is simultaneously applied to the separation layer.

36. A method according to Claim 25, wherein, in said step of heating the first member by induction heating, a pressure or a hydrostatic pressure by a fluid is simultaneously applied to the separation layer.

37. A method according to Claim 25, further comprising a step of removing a residue of the separation layer remaining on the semiconductor layer according to etching, after separating the semiconductor layer.

38. A method according to Claim 25, further comprising a step of reutilizing a remaining semiconductor substrate for preparing another first member, after separating the semiconductor layer.

39. A method according to Claim 38, further comprising a step of removing a residue of the separation layer remaining on the semiconductor substrate according to etching, before reutilizing the semiconductor substrate.

40. A method for manufacturing a solar cell comprising the steps of:

forming a porous silicon layer by anodizing a surface of a p^+-type nonporous silicon substrate;

sequentially forming a p^--type nonporous silicon layer and an n^+-type nonporous silicon layer on the porous silicon layer according to epitaxial growth;

attracting an attraction mount which is hardly heated by induction heating, on the n^+-type nonporous silicon layer;

separating the p^--type and n^+-type nonporous silicon layers from the p^+-type nonporous silicon substrate at the porous silicon layer by heating the p^+-type nonporous silicon substrate by induction heating; and

forming electrodes on the separated p^--type and n^+-type nonporous silicon layers.

41. A method according to Claim 40, wherein said step of heating the p^+-type nonporous silicon substrate by induction heating comprises a step of mounting the p^+-type nonporous silicon substrate attracted on the attraction mount on an induction-heating mount around which a coil is wound, and causing a current to flow in the p^+-type nonporous silicon substrate by supplying the coil with a high-frequency current.

42. A method according to Claim 41, wherein, in said step of heating the p^+-type nonporous silicon substrate by induction heating, the attraction mount is simultaneously cooled.

43. A method according to Claim 40, further comprising a step of removing a residue of the porous silicon layer remaining on the p^--type nonporous silicon layer, before forming electrodes after separating the p^--type and n^+-type nonporous silicon layers from the p^+-type nonporous silicon substrate.

44. A method according to Claim 40, wherein said step of forming the electrodes comprises a step of performing heat welding of a surface of the p^--type nonporous silicon layer onto an aluminum plate and simultaneously forming a p^+-type nonporous silicon layer by diffusing aluminum into the p^--type nonporous silicon layer, and a step of forming collecting electrodes on the surface of the n^+-type nonporous silicon layer.

45. A method according to Claim 44, further comprising a step of forming an antireflection layer on the n^+-type nonporous silicon layer on which the collecting electrodes are formed.

46. A method according to Claim 40, wherein the p^--type and n^+-type nonporous silicon layers are formed according to liquid deposition.

47. A method according to Claim 40, further comprising a step of reutilizing a remaining p^+-type nonporous silicon substrate for manufacturing another solar cell, after separating the p^--type and n^+-type nonporous silicon layers.

48. A method according to Claim 47, further comprising a step of removing a residue of the porous silicon layer remaining on the p^+-type nonporous silicon substrate, before reutilizing the p^+-type nonporous silicon substrate.

49. A method for manufacturing an SOI (silicon-on-insulator) substrate comprising the steps of:

forming a porous silicon layer by anodizing a surface of a p^+-type nonporous silicon substrate;

forming a p^--type nonporous silicon layer on the porous silicon layer according to epitaxial growth;

forming a silicon-oxide layer on the surface of the p^--type nonporous silicon layer;

forming a multilayer structure by bonding another nonporous silicon substrate on a surface of the silicon-oxide layer; and

separating the p^--type nonporous silicon layer from the p^+-type nonporous silicon substrate at the porous silicon layer by heating the multilayer structure by induction heating.

50. A method according to Claim 49, further comprising a step of attracting an attraction mount which is hardly heated by induction heating onto the multilayer structure, before heating the multilayer structure by induction heating.

51. A method according to Claim 50, wherein, in said step of heating the multilayer structure by induction heating, the attraction mount is simultaneously cooled.

52. A method according to Claim 49, wherein said step of heating the multilayer structure by induction heating comprises a step of mounting the multilayer structure on an induction-heating mount around which a coil is wound, and causing a current to flow in the p^+-type nonporous silicon substrate by supplying the coil with a high-frequency current.

53. A method according to Claim 49, further comprising a step of removing a residue of the porous silicon layer remaining on the p^--type nonporous silicon layer by etching, after separating the p^--type nonporous silicon layer from the p^+-type nonporous silicon substrate.

54. A method according to Claim 53, further comprising a step of smoothing the surface of the p^--type nonporous silicon layer by performing annealing in a reductive-gas atmosphere after removing the residue of the porous silicon layer.

55. A method according to Claim 49, further comprising a step of performing thermal oxidation of inner walls of the porous silicon layer before forming the p^--type nonporous silicon layer on the porous silicon layer according to epitaxial growth, and a step of smoothing the surface of the porous silicon layer by performing heat treatment in a hydrogen atmosphere.

56. A method according to Claim 49, wherein the p^--type nonporous silicon layer is formed according to chemical vapor deposition (CVD).

57. A method according to Claim 49, further comprising a step of reutilizing a remaining p^+-type nonporous silicon substrate for manufacturing another SOI substrate, after separating the p-type nonporous silicon layer.

58. A method according to Claim 57, further comprising a step of removing a residue of the porous silicon layer remaining on the p^+-type nonporous silicon substrate, before reutilizing the p^+-type nonporous silicon substrate.